

CLAIMS

1. A positive electrode active material comprising a lithium-containing composite oxide containing at least nickel and manganese elements, said positive electrode active material comprising primary particles of said composite oxide having a twining portion.

2. The positive electrode active material in accordance with claim 1, wherein said composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure.

3. The positive electrode active material in accordance with claim 1, wherein said composite oxide has a defected or disordered portion in the crystal lattice thereof.

4. The positive electrode active material in accordance with claim 1, wherein said composite oxide has a superlattice arrangement of a $[\sqrt{3} \times \sqrt{3}] R30^\circ$ when assigned as R3-m.

5. The positive electrode active material in accordance with claim 1, wherein said composite oxide contains nickel and manganese elements substantially at the same ratio.

6. The positive electrode active material in accordance with claim 1, wherein said composite oxide has an integrated intensity ratio (003)/(004) of the X-ray diffraction peak when assigned as R3-m which satisfies the equation:

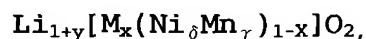
$$(003)/(104) \leq 1.2.$$

7. The positive electrode active material in accordance with claim 1, wherein said composite oxide has an extra spot or streak substantially in every electron beam diffraction pattern indexed when assigned as R3-m.

8. The positive electrode active material in accordance with claim 1, wherein said primary particles have at least one of spherical and rectangular parallelepiped hexahedron shapes.

9. The positive electrode active material in accordance with claim 1, wherein said primary particles have a particle size of 0.1 to 2 μm and said composite oxide further comprises secondary particles with a particle size of 2 to 20 μm .

10. The positive electrode active material in accordance with claim 1, wherein said composite oxide is represented by the formula (1):



where $-0.05 < y < 0.05$, M is one or more elements other than nickel and manganese, $-0.1 \leq x \leq 0.3$, $\delta = 0.5 \pm 0.1$, $\gamma = 0.5 \pm 0.1$, and $-0.1 \leq x \leq 0.5$ in the case of M being cobalt.

11. The positive electrode active material in accordance with claim 10, wherein M is trivalent in oxidation state.

12. The positive electrode active material in accordance with claim 10, wherein M comprises at least one

selected from the group consisting of aluminum and cobalt.

13. The positive electrode active material in accordance with claim 10, wherein M comprises at least one selected from the group consisting of magnesium, calcium, strontium, zirconium, yttrium and ytterbium magnesium.

14. A non-aqueous electrolyte secondary battery comprising: a negative electrode containing, as a negative electrode active material, a material capable of absorbing and desorbing lithium ions and/or metal lithium; a positive electrode containing the positive electrode active material in accordance with claim 1; and an electrolyte.